1-1-1999

Trade reforms and manufacturing performance: Australia 1989-97

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Working Paper Series 1999

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WP 99-13

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Abstract

Advocates of the competitive market paradigm strongly believe that "getting the price right" would improve manufacturing performance. Australia experienced extensive trade reforms in the late 1980s and 1990s which were expected to promote a competitive manufacturing sector. This paper examines whether these trade reforms have had a positive impact on the growth performance of the manufacturing sector. Selected growth performance variables- labour productivity, price-cost margins and exports - were regressed on change in protection variables. The results of the study are consistent with the hypothesis that trade reforms have increased the growth performance of the manufacturing sector.

Key Words: Trade Reform, Performance, Industry, Australia

Introduction[1]

The recent developments in the World Trade Organisation (WTO) and the Asia Pacific Economic Cooperation Forum (APEC) towards a more outward looking response to a changing world environment accelerated the need for the removal of protection in a planned manner. As a response, protectionism to unilateral liberalisation and participation in regional trade liberalisation are the recent trade policy focus in Australia. One of the policy goals is to promote a competitive manufacturing sector.

Findings on the role of foreign trade reforms on productivity growth in Australia tend to show positive results (Dixon and McDonald, 1991; Industry Commission 1997; Oczkowski and Sharma, 1999). This paper tries to add to the debate on the effects of recent trade reforms on not only productivity growth but also on export growth and changes in price-cost margins. These indicators of performance are estimated at the 4-digit manufacturing branches as a whole and textiles, clothing and footwear (TCF) and passenger motor vehicles (PMV) separately. Recently, TCF and PMV industries experienced extensive liberalisation. A set of indicators of trade liberalisation in combination with branch structure and technology variables is used to explain change in performance in a cross-sectional regression model. We conduct the analysis over two alternative periods 1989/90 to 1992/93 and 1989/90 to 1996/97.

The first section of the paper discusses the possible links between trade reforms and performance. The second section reveals trade policy in Australia, focusing before and after 1988; it also reports the result of protection and trade efficiency studies for Australia. The third section considers the methodology used in this study. The fourth section reports the result of cross-sectional regression analysis on two different sets of data 1989/90-1992/93 and 1989/90-1996/97. The last section draws conclusions.

Trade Policy and Performance

The expectation of removal of protection is to generate industrial efficiency by eliminating allocative distortions in line with competitive comparative advantage, lower "x-inefficiency" by exposure to foreign competition, and higher long-run rate of growth by exposure to greater technical change and by access to long-run economies of scale in an open environment.

Empirical studies that have revealed the relationship between trade reforms and performance have tended to use productivity growth, export growth and changes in price-cost margins as yardsticks of performance measures. Productivity measures capture efficiency in input use. Exporting is likely to reflect international competitiveness. The price-cost margins reflect the extent to which domestic producers can price monopolistically (Havrylyshyn, 1990; Kirkpatrick and Maharaj, 1992; Jayanthakumaran, 1996/97).

Three approaches have been used to capture trade effects in empirical analysis: static efficiency measures for individual countries; comparison of the performance before and after reforms; and of reformers and non-reformers by using cross-country studies and detailed country case studies.

Static measures generally indicate unanticipated effective protection and profit incentives to the sectors concerned and a shelter to high-cost producers especially in the developing countries (Weiss 1990). Before and after liberalisation (or trade policy reformers and non-reformers) studies indicate that the stronger and speedier the liberalisation, the greater the manufacturing output and export growth[2]. One should be careful interpreting the results, mainly because there is no evidence showing that it is liberalisation which causes this improvement.

Three types of studies have been used linking trade policy and performance; first, regressions which pooled a sample of countries with differences in trade policies at different periods; secondly, regressions based on individual countries, by type of economic policy (i.e, more open or less open); finally regressions of plant level data of a number of countries.

The cross-country regressions seem to be sensitive to slight alterations in the policy variables and to small changes in the sample of countries chosen and to a choice of time period reflecting the stage of the business cycle.

A number of recent detailed country studies using market Structure-Conduct-Performance analysis (S-C-P) tend to shed some light for the belief that trade reforms generate short-run positive efficiency gains leaving scepticism over long-run effects. The majority of studies indicated a short-term positive productivity growth due to trade reforms. There are strong reasons to believe that the degree of concentration will reduce with the opening to international trade. However, some empirical studies show that opening to trade increases the collusive agreements between domestic firms and this may enhance price markups (De Melo and Urata,1984). Available studies indicate that trade reforms have a positive impact on manufacturing exports due to an increase in price competitiveness. Further work on these lines may lead to firmer conclusions on the effects of liberalisation[3].

Trade Policy Reforms in Australia

For most of the period from 1968/69 to 1988/89, Australian trade policy has targeted reduced controls on foreign trade. However, partly as a response to balance of payments difficulties and partly as a response to protect passenger motor vehicles (PMV), textiles, clothing and footwear (TCF) from import competition, this was not entirely implemented. PMV and TCF branches have received both tariff and non-tariff incentives throughout. The attempt to eliminate non-tariff barriers in PMV and TCF branches in 1988 and 1993 respectively and to reduce tariff barriers over time from 1988, has been described as a major breakthrough in liberalisation (Industry Commission 1995). Unlike the former trade reforms, the present one is associated with greater macro-economic stability, radical micro-economic reforms and greater external stability.

The Australian manufacturing industry as a whole has undergone substantial declines in government assistance between 1968/69 to 1988/89. A 25 per cent uniform tariff cut was imposed in 1973. The macro-economic imbalances, especially the rise in wage rates and interest rate in real terms, that occurred right after the removal of tariffs made the government reverse its decision and embark on a quota system once again. During 1972/73 due to a commodity price boom and capital inflow, the balance of payments went into surplus and led to monetary expansion and currency appreciation. The currency appreciation in turn led to a deteriorating current account and recession in 1974/75.

The introduction of quantitative import restrictions to a number of sectors including PMV and TCF in 1974/75, and increased level of tariffs in these sectors, was quite obviously

inconsistent to the original trade reform program. Although the quotas applying to other sectors were removed soon after, the quotas for PMV and TCF remained until the early 1990s. In addition, PMV and TCF received favourable treatment throughout on the basis that these industries were uncompetitive and needed support. PMV has received export facilitation in 1984 under which producers are allowed to import a certain percentage of their total value of production duty free. This percentage varied overtime. TCF has received Voluntary Export Restraints (VER) between 1974-77. Anderson (1995) concluded that: overall the PMV industry has been governed by a complex range of government policies; the labour intensive TCF industry has experienced a comparative disadvantage; and both industries generated costs in relation to benefits.

Tariff reductions in 1977 were introduced as a response to the devaluation of the Australian dollar in November 1976. The expectation was to minimise adverse effects on local industries, and involved the removal of unused assistance from low-cost industries (Industry Commission, 1995). Relatively stable macro-economic conditions, with a low inflation rate of about 8 per cent compared to 15 per cent in 1975, was a favourable condition at this stage.

The sudden investment slump and recession with another wage explosion that followed in the early 1980s, reduced the benefits that could have accrued through trade reforms. In the meantime, the Australian dollar rose about 50 per cent in real terms between 1981-85 and the terms of trade worsened due to a collapse in commodity prices. The external uncertainties finally led the government to float the Australian dollar in 1983 (Corden, 1997). Keating and Dixon (1989) mentioned that the current account deficit, which averaged 4.8 per cent of GDP over the 6 years to 1985/6, was more or less explained not only by macro-economic conditions such as huge public sector borrowing, overseas borrowing that generated inadequate returns but also a lack of competitiveness in domestic industries partly reflecting wage/price inflation and structural rigidities.

The terms of trade improved due to an increase in commodity prices by the mid 1980s. In addition, two major changes occurred on the micro-economic front: one was financial deregulation in the areas of free entry, removal of controls in lending rates and removals of restrictions on bank portfolios; the other one was to reduce real wage rates, due to the wage-price agreement between the government and the major trade union organisation (ACTU), which remained as a major obstacle to competitiveness in the manufacturing sector since the early 1970s.

As a result of these policies, the average Effective Rate of Protection (ERP) for the

manufacturing sector dropped from 35 per cent in 1971 to 15 per cent in 1988/89. Among the various sectors, TCF and PMV received the highest ERP of about 113 per cent and 52 per cent respectively even in 1988 (Industry Commission, 1995).

The radical trade reform process began in 1988 following the realisation that the expanded exports of manufacturing were essential to the prosperity of that sector, and the realisation that expanded protection in an interdependent sector/economy would support only a single manufacturing industry at the expense of other manufacturing, agricultural and mining industries. As Keating and Dixon (1989), at this stage, pointed out Australia intended to target industries that were internationally competitive, export-oriented and capable of lasting a long-time with a minimum level of assistance.

A general program of phased reductions in nominal tariffs for most imports except PMV and TCF was announced in 1988. Initially, tariffs above 15 per cent were expected to be lowered to 15 per cent. Then tariffs between 15 per cent and 10 per cent to be lowered to 10 per cent by 1992. Further, a 2 per cent revenue duty on imports was removed. Trade reforms continued throughout the 1990s in goods and services as well. Reforms occurred in anti-dumping and countervailing duty, export finance and quarantine and inspection services in 1996/97 (Industry Commission 1996/97). By this time Dixon and McDonald (1993) noted rapid changes in the Australian economy between 1986/87 and 1990/91; a 30 per cent appreciation in the real exchange rate following the improvement in the terms of trade, an increase in the capital/labour ratio following the improvement in investment, more exports of non-traditional manufacturing products and a general increase in imports. A brief recession and job losses in the early 1990s did not stop further implementation of the program.

Import restriction by quota was no longer available to the manufacturing sector, terminating for PMV in 1988 and TCF in 1993. Tariffs protecting these two industries were the only instrumentality of protection and tariff rates were substantially reduced in 1991. The Industry Commission (1995) estimated that the nominal tariff rates will be 15 per cent and 25 per cent for PMV and TCF respectively by the year 2000.

In addition to stable economic conditions with low inflation and low interest rates, intensive micro-economic reforms were initiated during the mid 1990s aimed at enhancing the aggregated benefits from trade reform. The current Coalition Government is committed to more efficient infrastructure services, more flexible labour market, more advanced taxation system, less red tape and access to competitively priced goods and services[4]. The major trade reform program that was initiated in 1988 was consistent and pursued even through

the country received a devastating currency depreciation and was on the brink of recession due to the Asian financial crisis by 1998/99. The effects of the trade reforms on the performance of domestic producers are discussed below.

Table 1: Aggregate Indicators of Trade Reform: Australia

	1989/90	1992/3	1996/7
Effective Rates of Protection* (%)	15	12	6
Net subsidy equivalent* ($ mil)	10230	7683	4001
Manufacturing gross product index (at constant 1989/90 prices)*	100	97.4	108.9
Branch tariffs as a % of imports (at constant 1989/90 prices)**	8.72	6.39	4.22
Manufacturing trade balance as a % of GDP**	-6.3	-4.6	-5.0

Source: * Industry Commission 1995 and Reserve Bank 1998

** computed

Table 1 shows that Effective Rates of Protection (ERP) were reduced from 15 per cent to 6 per cent between 1988/89 and 1996/97. These reductions in effective protection resulted in a reduction in a net subsidy equivalent to $10.2 million in 1988/89 to $4 million in 1996/97. In other words, an estimate of the amount of money which would have to be paid by way of subsidy to assist the manufacturing sector to the same extent as the effective rate of protection has been reduced by $6 million. As a result of reductions in tariff rates, government revenue from tariffs at the branch level as a ratio of imports has been reduced to 4.22 per cent in 1996/97 compared to 8.72 per cent in 1988/89.

In 1998, the manufacturing sector contributed 14 per cent of GDP and 13 per cent of employment. There were positive performances in productivity growth in this sector; the Industry Commission (1997) estimated annual total factor productivity growth as 0.75 and labour productivity growth as 0.53 between 1988-95; Oczkowski and Sharma (1999) estimated annual growth in total factor productivity ranged from 0.2 to 2.8 per cent. Dixon and McDonald (1991) estimated annual labour productivity growth as 1.59 per cent between 1979/80 to 1989/90. The trade balance among the manufacturing branches as a percentage of GDP has been reduced from - 6.3 in 1989/90 to -5.0 in 1996/97 mainly as a result of improvements in exports. However, the manufacturing sector's share in terms of GDP is still low compared to OECD countries.

The Methodology

To test the hypothesis that trade reforms have had a positive impact on performance in

manufacturing, a formal Ordinary Least Squares (OLS) cross-sectional regression model was estimated:

GP = f (TEC, STR, CTP)

where GP indicates growth performance variables and TEC, STR and CTP indicate technology variables, structural variables and change in trade policy variables respectively. We estimate the model over different periods for which adequate data are available. If the changes in one of the trade policy variables (CTP) are significantly associated with the performance variables with the expected sign, then it supports our hypothesis.

Growth performance variables (GP) are as follows:

- labour productivity growth (GLP): Labour Productivity (LP) is defined as value-added per worker at constant prices; GLP is growth in labour productivity expressed in natural logarithms.
- export growth (GEXP): GEXP is growth in exports at constant 1989 prices at the branch level expressed in natural logarithms.
- changes in price-cost margins (CPCM): Price Cost Margins (PCM) is defined as the difference between value-added and wages in terms of output all at current prices[5]; CPCM is change in PCM in natural logarithms; a fall in this indicator reflects more competitive pricing.

Three different types of explanatory variables were used to explain the performance at the four-digit branch level:

- technology variables (TEC): We include four variables; capital-labour (KL) and labour-output (LO) ratios per branch and indices of technology (INT) and scale (INS) per branch. KL is defined as capital increment to wages in 1992/93; KL reflects capital intensity in a branch. LO is defined as wages to output in 1992/93; LO reflects labour intensity in a branch. INT is defined as the measure of the ratio of average labour productivity in a branch to best-practice productivity in the branch in Australia; INT is to reflect the range of technology used in a branch. INS is defined as the ratio of average output per establishment in a branch to the average output in the largest-size category of establishment in the branch; INS is to reflect the range of production scale in use in a branch[6].
- market structure variables (STR): Two structural variables are used; Output growth (OG) and concentration ratio (CR). OG is defined as increase in output at constant prices; this is to capture the effect of dynamic economies of scale - the Verdoorn relationship. The four-firm concentration ratio (CR) is used to reflect market conditions.

Data on CR is available for a point in time (1992/93), so that changes in CR are not used as an independent variable[7].

- change in trade policy variables (CTP): We define liberalisation as a reduction in controls - licences, quotas and taxes - on foreign trade. To capture the liberalisation we used four variables: change in effective rates of protection (CERP), change in average tariffs (CAT), change in exports in total sales (CXS) and change in internal demand (CIND). ERP is defined as domestic value-added to world value-added; a fall in ERP over time at the branch level means increased trade liberalisation and is referred to as CERP. CAT is defined as reduction in tariffs at constant prices; the average nominal tariffs per branch divided by total tariffs in manufacturing. CXS is an export intensity variable defined as change in exports in total sales at constant prices; reflecting external demand. CIND is defined as change in internal demand at constant prices; total sales less exports for each branch. From the above measures, we focus on change in effective protection (CERP) in detail, on the grounds that, provided protection estimates are based on actual price comparisons rather than on schedule tariff rates, they are supposed to capture the impact of both tariff and non-tariff restrictions on trade.

Table 2: Expected signs: Performance Indicators and Explanatory Variables[1]

Explanatory variables	Performance variables		
	GLP	GEXP	CPCM
Change in average tariffs (CAT)	-	-	+
Change in effective protection (CERP)	-	-	+
Change in internal demand (CIND)	*	-	*
Index of technology (INT)	-	-	+
Labor-output ratio (LO)	-	*	*
Capital-labor ratio (KL)	+	-	-
Index of scale (INS)	-	-	+
Output growth (OG)	+	*	*
4-firm concentration ratio (CR)	-	+	+
Change in exports in sales (CXS)	*	+	*

Note: * not included in our analysis.

As trade reforms promote productivity and export growth one can see a negative relationship between these performance variables and reduction of tariffs (or effective protection). As trade reforms reduce price-cost margins (this is used to reflect monopolistic pricing) there will be a positive association between price-cost margins and reduction of

[1] Signs are based on neo-classical theory.

tariffs (or effective protection).

Change in export share in total sales reflects export intensity. Changes in internal demand reflect domestic intensity. The expectation is that export growth is determined by external demand (CXS), competitiveness (CERP) and internal demand (CIND). One can expect a negative relationship between growth in exports and internal demand as the lower is internal demand the higher will be export growth. However, there will be a reversed sign if internal demand is accompanied by improvements in productivity, intra-industry trade and economies of scale. We do expect a positive association between growth in exports and changes in export share. However, there would be a negative relationship if firms are at an initial level of export orientation, so that they find it difficult to increase exports.

Since higher capital intensity is likely to be associated with greater technical change, capital intensive variables are positively associated with productivity growth. One would expect a negative relationship between price-cost margins and capital intensity; the expectation is that increases in margins will be difficult the higher is capital intensity, since for a given rate of profit the margin required rises with capital intensity. Labour intensity is associated with lower technical change and there will be a negative relationship between these variables and productivity growth. If factor-intensity has an influence on export performance then the expectation is that the capital-labour ratio will have a negative influence on exports. Technology and scale indices are expected to be negatively associated with productivity growth and positively associated with changes in price-cost margins. The low level of indices reflects the scope for competition, as technologically backward or smaller firms catch up with their technologically more advanced or larger rivals.

Since it is assumed that the Verdoorn relationship holds, one would expect a positive relationship between output growth and productivity growth. The higher the concentration the lower will be the extent of competition. Therefore, the expectation is that the concentration ratio is negatively associated with productivity growth and positively associated with the change in price-cost margins and exports.

Data relating to number of workers, wages, value-added, output and capital expenditure have been obtained from surveys and censuses of ABS-Manufacturing industry of 1992/93, 1996/97. Value-added for 1996/97 has been obtained from ABS on request as this was not available in the Annual Census 1996/97. The census and surveys cover all manufacturing establishments in the states, government-owned business undertakings and private establishments.

The disaggregated figures of tariff rates, imports and exports of 1988/89, 1992/93 and 1996/97 have been used to compute CAT, CXS and IND at the ANZSIC 4 digit level; these data have been obtained from ABS-Customs on request. The estimates of effective rate of protection are available in ASIC four-digit classification published by the Industry Commission; this is converted into ANZSIC classification for our purpose.

Results

We have analysed two alternative periods 1988/89-1992/93 and 1988/89-1996/97 and in both cases the branch analysis is at the ANZSIC 4-digit level taking 151 observations. It is expected that the first period captures the immediate impact of reforms of 1988/89 and the latter capture the impact of reforms over time. In addition, we have disaggregated the sample into branches for which protection fell drastically. The liberaliser branches are from textiles, clothing, footwear (ANZSIC 22) and machinery, equipment (ANZSIC 28). Also, we have analysed the rest of the 104 branches. Our calculations are limited to data constraints. We used the capital/labour ratio as one of the independent variables. Since we do not have capital stock at the branch level, we used net capital expenditure to number of workers at the branch level for the capital labor ratio calculations.

Table 3: Productivity results: (1988/90 - 1996/97)

GLP	Sample size	Constant	CERP	INT	LO	OG	R^2	F
1	150 (All)	-.081***	.-.204**	.988***	-.69***	.035	.43	27.8***
2	45 (Liberalisers)	-.166***	-.259*	.72***	-.309**	.318**	.66	19.5***
3	104 (Others)	-.096***	-.144	1.14***	-.844***	-.086	.44	21.9***

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Table 3 indicates the productivity results for the period 1988/90-1996/97. Over this period we find better results linking trade reforms and productivity performance, although the fit for the equation for the entire branches is not very strong. As expected there was a negative but weakly significant (at the 5% level) relationship between growth in labour productivity and effective protection. The negative and significant relationship between labour intensity ratio and labour productivity growth implies lower labour intensity is likely to be associated with higher labour productivity. The index of technology variable is significant but with an unexpected positive sign reflecting higher barriers to entry for new producers at the branch level.

Among the liberalisers support for our argument is found in that the overall fit of the equation improves, and for growth in labour productivity the trade policy variable is weakly significant with the expected sign. Output growth in the liberaliser branches is positively and

significantly related with labour productivity growth; reflecting the importance of dynamic increasing returns. In these branches, lower labour intensity is associated with higher labour productivity. As with the entire branches it is likely that there are higher barriers to entry for new producers with liberalisation. For growth in labour productivity the effective rate of protection is not significant in the rest of the branches. The Verdoorn relationship does not exist in this sample.

Table 4: Export results: (1988/90 - 1996/97)

GEXP	Sample size	Constant	CERP	INS	CXS	CIND	R^2	F
1	150 (All)	.377***	-.215*	.432**	.138	.381**	.11	4.7**
2	45 (Liberalisers)	.233**	-.509***	.465	.619***	.425	.38	7.9***
3	104 (Others)	.398***	-.047	.457**	.054	.384	.09	2.6

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Table 4 shows the export results for the period 1988/90-1996/97. There tends to be a negative and significant association (at the 10% level) between the growth in exports and effective protection for the entire branches. The change in internal demand is significant but with an unexpected positive sign reflecting the likely improvement in productivity and involvement in intra-industry trade over this period. Higher the internal demand greater will be growth in exports; reflects the improvement in productivity and intra-industry trade. For this measure, index of scale is positively but highly significantly related with growth in exports reflecting a high barrier to entry in the branch level; indicating lack of opportunities for the technologically backward or small firms to catch up with their technologically advanced rivals.

Among the liberalisers support for our argument is found in that the overall fit of the equation improves, and for growth in exports the trade policy variable is highly significant (at the 1% level) with the expected sign. We did not find support for the hypothesis in the rest of the branches, in that the overall fit of the equations worsens. Among the liberalisers the change in export share is positively and significantly related with export growth; reflecting the rising external demand for the PMV and TCF products. Internal demand growth is positively related with export growth but not significant. If this variable is significant, then the likely implication is that the expansion in both the export market and domestic market lead to higher export growth.

Table 5: Price-cost margin results: (1988/90 - 1996/97)

CPCM	Sample size	Constant	CERP	INT	KL	GLP	R^2	F
1	150 (All)	-.182***	-.205*	.523***	-.301**		.19	11.2***
2	150 (All)	-.049**				.731***	.53	170.5***

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Table 5 shows the price-cost margin results for the period 1988/90-1996/97. The change in price-cost margins (CPCM) for this period suggest that the changes in effective protection are weakly significant (at the 10% level), but with an unexpected negative sign. The lower the effective protection the higher the price mark-ups. The implication is that productivity gains are passed on to producers as higher profit margins. This productivity gain has not passed on to consumers in lower prices. We can notice that change in the price-cost margins is positively and significantly correlated with growth in labour productivity. The implication is that rising import competition has failed to induce more competitive prices[8]. The change in price-cost margins is positively related with the capital-intensive variable and negatively related with the index of technology as expected; both are highly significant.

Over the shorter period no support is found for the trade liberalisation and performance hypothesis. A change in the average tariff is negatively related with growth in productivity as expected but is not significant. Also changes in effective protection is negatively related with labour productivity growth but not significantly. Our result does not capture the short-term impact of reform. Growth in labour productivity is positively and significantly (at the 1% level) related with output growth. This means that the productivity response is greater the higher is the degree of reform for the branch concerned for a given rate of output growth. Over the shorter period, the negative and significant association between the capital/labour ratio and productivity is unexpected. This reveals that lower capital intensity is likely to be associated with greater technical change. As with the longer period, growth in exports is positively and significantly related to the concentration ratio and index of scale. Internal demand is positively and significantly (at the 10% level) related with export growth in the other model. Selected equations for this period are given in the Appendix.

Conclusions

We do find a weak relationship between trade reform and labour productivity growth for the period 1988-1997, although we cannot establish any relationship in the short-run. We can note the similarity between our results and that of Chand (1997) for Australia. He concludes that a one per cent decline in the nominal protection rates leads to between a 0.18 and 0.56 per cent gain in multi-factor productivity between 1967/68 and 1994/95. Our results show that the association is stronger among the liberalising branches and this tends to indicate

resource reallocation in response to removal of quota and removal of tariffs in the traditionally protected TCF and PMV sectors. Trade reforms do appear to have an indirect influence on productivity via its output growth and this is true among liberalisers and among the short-run sample. In the longer period, lower labour intensity is associated with higher labour productivity; this is true among liberalisers.

In the short-run, we obtained an unexpected negative association between capital intensity and labour productivity growth. We can note some link between our short-run results and those of Dixon and McDonald (1993) for Australia. They found that most sectors in the economy appeared to be working with a capital labour ratio considerably in excess of the ratio dictated by relative factor prices and therefore they conclude that the recovery in business capital formation may be slow between 1986/87 and 1990/91. Further they argue that the changes in protection had relatively little impact on the economy. Our results reflect these factors unambiguously during the short period.

Improvements in productivity and competitiveness can lead to improvement in export performance. Our analysis of data on export performance over a period 1988-97 establishes a link between price competitiveness and greater exports. This link is stronger among the liberalising branches and we can interpret it as the result of long-run price competitiveness in response to removal of protection between 1988-97. For the entire branches internal demand and for the liberalisers export market share are the determining forces. We assume that the technology diversity ratios reflect a higher barrier to entry in the branch level and there is lack of opportunities for the technologically backward or small firms to catch up with their technologically advanced rivals.

There is no support for our "import discipline" hypothesis which says that the monopolistic domestic producers would be forced to lower their prices as a result of external competition. The implication is that the positive productivity growth does not seem to have an effect on lower prices. There may be some element of monopoly at work in Australia which is reflected through the measures of liberalisation, in this case effective protection estimates, that we used in this analysis. We assume that the effective protection estimates reflect the pricing policy of distributors and there is a slow reduction in this ratio over time.

In brief, this sort of analysis rarely gives conclusive results but the results indicate some support for the hypotheses that falling protection is associated with rising productivity and rising exports at the branch level; so that the greater liberalisers tend to show better performance. As we noted the association and the explanatory power of the equations is weak. The model needs to be developed further to capture the other factors which may

influence the relationship.

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Appendix 1: Selected Regression results: 1988/9-1992/93

GP	Constant	ERP	CAT	OG	INS	KL	GLP	LO	CR	CIND	R^2	F
GLP	.004***		-.045	.388***		-.274***					.21	12.9***
GLP	.004***	-.038		.389***		-.266***					.21	12.9***
CPCM	.003*	.024					.719***	-.278***			.65	91.1***
GEXP	.116	-.173			.285**	-.223*			.302***		.18	7.9***
GEXP	.248***	-.134			.485***					.352*	.10	5.3**

Note: *** 1% significance level, ** 5% significance level, * 10% significance level.

Variables as defined in the text.

Endnotes

[1] I wish to thank Dr. Joan Rodgers, Associate Professor Charles Harvie, Professor D.P Chaudhri , Dr. Ann Hodgkinson and Dr. Khorshed Chowdhury for their helpful comments on earlier versions of this paper; any remaining errors are the author's own responsibility. Financial support from the Department of Economics, University of Wollongong is gratefully acknowledged.

[2] Michaely, Papageorgiou and Choksi (1991) used a before (pre liberalisation) and after (post liberalisation) approach on 17 countries and 36 substantial and long lasting liberalisation "episodes". Thomas and Nash (1991) employed a cross-country analysis and found a general increase in manufacturing exports among the group of trade policy reformer countries compared to non-reformers.

[3] See Jayanthakumaran, 1996/7 for a detailed survey of these issues.

[4] Reforms were initiated: public sector reforms related to pricing, structure and ownership; labour market reforms related to labour market arrangements including restructuring the industrial relations system, enterprise bargaining and vocational education and training program; environmental management reforms related to implementing economic instruments for achieving environmental goals; and industry specific reforms (please see Industry Commission 1996/7).

[5] $PCM = \frac{V - W}{O}$ where V is value-added, W is wages, and O is output, all at current prices. V is estimated as V = O - M. Where M is material inputs (excluding capital charges).

[6] All technology variables are computed for a single year on the grounds that any changes in these variables will be long-term and will not affect short-term performance. For our purpose we used the capital/labour ratio for the period 1992/3 and technology ratio for the period 1996/7. Comparable data for the capital/labour ratio is not available thereafter.

[7] We estimated concentration ratios for the four digit level by using available two digit level estimates.

[8] Similar results have been obtained in Chile by de Melo and Urata (1984) and in Sri Lanka by Weiss and Jayanthakumaran (1995). Both of these studies conclude that this unexpected result is due to continued monopolistic control over the distribution sector; higher price mark-ups imposed by distributors result in higher mark-ups by local producers of import-competing goods.